The Jewish Astrolabes Project

Arts & Humanities Research Council

http://warburg.sas.ac.uk/research/projects/astrolabes/

Astrolabes in Medieval Jewish Society

A three-year project on Astrolabes in Medieval Jewish Society, supported by the Arts and Humanities Research Council (project code AH/I003800/1) began on May 23, 2011, with Charles Burnett as Principal Investigator, Stephen Johnston of the Museum of the History of Science (Oxford University) as Co-Investigator, and Josefina Rodriguez Arribas as Researcher.

This project is being run jointly by the Warburg Institute and the Museum of the History of Science (Oxford University), and will survey on the one hand astrolabes and related instruments made or possessed by Jews in the Middle Ages, and on the other, Hebrew texts on the construction and use of the astrolabe, with the aim of producing a monograph on the place of the astrolabe in medieval Jewish society and an illustrated catalogue of the instruments. A blog is being set up at the Museum of the History of Science which will give full details of the project and its progress.

Why Jewish Astrolabes?

What was the role of the astrolabe in Jewish culture? It was as important as the role it played in Muslim and Christian cultures: the astrolabe was the most symbolic of medieval astronomical instruments and embodied the best astronomical knowledge then available. It was associated with power and luxury in the Muslim and Christian courts, where astrologers (frequently Jews) used it to forecast the future of the king and his kingdom. They were occasionally treated like jewels, and as such, they were embellished with precious stones and displayed in public. They were (and still are) collectible items that indicated on the metal of the mater the names of the patron and the maker. Very few astrolabes with Hebrew script are extant; they are characteristically restrained in their decoration, which makes the Hebrew script especially noticeable. There is sufficient (instrumental and textual) evidence that Jews were involved in the diffusion of the astrolabe through texts and instruments. Some of them, like Levi ben Gerson (13th c.), introduced improvements and modifications in the standard planispheric astrolabe. Others, like Abraham ibn Ezra, found in the biblical text indications of its knowledge among the Israelites before its invention by the Greeks. Research about the astrolabe in Jewish culture and the degree of involvement of Jews in astrolabe making and astrolabe diffusion is still lacking in the fields of Jewish studies and of the history of science. Researchers should pay attention to the fact that astrolabes in Jewish culture employed many languages (Hebrew, Catalan, Judaeo-Arabic, Arabic, and Castilian) and were used in very different contexts, which was a reflection of the complexity and diversity of Jewish culture in the Middle Ages. The Hebrew astrolabes displayed at the British Museum in London and at the Adler Planetarium in Chicago are interdisciplinary artefacts made in the interplay of medieval science (astronomy), medieval practice (astrology), and medieval philosophy (cosmology). They took their form and were preserved and modified in the context of an ensemble of knowledge whose texts and instruments travelled much more than usually assumed and whose writers, readers, and makers were less homogeneous than previously believed. All of this indisputably makes the astrolabe a fascinating artifact and an illuminating object about Jewish culture in the Middle Ages.

THE JEWISH ASTROLABES PROJECT

"It is well-known that sages cannot find the exact moment of midday, unless with great effort and large astrolabes, and certainly they cannot find the exact moment of midnight, which is more difficult."
(Abraham ibn Ezra's biblical commentary on Exodus 11:4, 12th century)

"He told us that there was at the gate of the city one of the Arabic sages who was an astrologer able to reveal future things before they happened. ... We saw a very old man ... in his hand an astrolabe and on it something like a latticework. He measured the sun in its circuits, its speed in its orbit, the inclinations of its path, and the deviation of its shadow [...] the rising sign and the signs of the zodiac in it (i.e. in the rising sign), its chords and its angles at the four points of the horoscope [...].

When we stood before him, we said to him: Tell us the question that we have in mind and we will give you a reward. [...] He hung the astrolabe from his fingers and measured the sun in its orbit. He made the rising sign go through the four angles and determined the fate of every man according to his judgement of the signs, almost as if the stars of Eden knelt down before him and sat with him on the earth" (Judah ben Solomon al-Harizi, Sefer Tahkemoni, rhymed prose, 12th-13th century).

PLACES AND DATES OF THE MANUSCRIPTS

THE SPHERES OF THE HEAVENS PROJECTED ONTO THE EARTH (TROPICS OF CAPRICORN AND CANCER AND THE EQUATOR)

FOR ANY SPECIFIC HORIZON (ALMUCANTARS AND AZIMUTHAL LINES)

AND EVERYTHING CONTAINED IN THE *MATER* (FRONT AND BACK) AND KEPT TOGETHER BY A PIN AND A *HORSE*

A SIGHTING DEVICE USED IN CALCULATION AND IN OBSERVATION: THE *ALIDADE*

ON TOP OF THE ENSEMBLE OF ELEMENTS, THE *SPIDER*, A NET IN WHICH THE MOST BRILLIANT STARS HAVE BEEN CAUGHT

"If you want to know in which sign the sun is and which degree of the zodiac it is crossing, find the day of the Christian month and place the alidade on this day in the circle of the months. When you have done this, you will see that the alidade falls on the zodiac on the degree of the sign in which the sun is"
(Jakob Ben Makhir Ibn Tibbon's treatise on the Astrolabe, Hebrew translation of Ibn Al-Saffar's Arabic Text, 13th Century)

"But your servant Ibrahim, when he saw the grandeur of your status over all that might compete with it, / when he saw that there was nothing that could compete with the grandeur of your status, / was not satisfied with giving you the Earth, and so he presented you with (a model of) the highest sphere together with all that is within it"

MANUSCRIPTS AND INSTRUMENTS

1 - Cambridge, Cambridge U. Library, Ms Add.650.2 (Abraham ibn Ezra's *Sefer kli ha-nehoshet*, 16th c.): Incipit with poem.
2 - Oxford, Bodleian Library, Ms Huntington 582 (Abu Qasim ibn al-Saffar *On the astrolabe*, 14th-15th c.) Judaeo-Arabic version.
3 - London, British Library, Ms ADD 26984 (*Bi'ur aher be-asiyyat kli ha-astirlab*, 15th c.).
4 - London, British Museum, front of a Jewish astrolabe.
5 - Mantua, Comunita Israelitica, Ms 10 (Abraham ibn Ezra's 2nd version of *Sefer kli ha-nehoshet,* 15th c.): Incipit with poem.
6 - Copenhagen, Kongelige Bibliotek, Hebrew codex 37 (Maimonides *Guide for the Perplexed*, 1347-48): Jews as astronomers.
7 - Oxford, Bodleian Library, *The Kennicott Bible* (1476, illustrated by Joseph Ibn Hayyim).
8 - London, British Museum, back of a Jewish astrolabe.
9 - St. Petersburg, Intitute of Oriental Studies of the Russian Academy of Sciences, Ms B446 (Almosnino's *Hibbur al ha-astrolab*, 18th c.): Tables with planetary positions.
10 - Oxford, Bodleian Library, Ms Opp 579 (Hermanus Contractus *On the astrolabe*, Hebrew translation from Latin, 16th c.): Table with latitudes and longitudes of stars.
11 - Jerusalem, Holo Nahum collection (Abraham ibn Ezra's *Sefer kli ha-nehoshet*, 14th c.)
12 - Florence, Biblioteca Medicea Laurenziana, Ms Plut. 88.28 (*Ma'aseh kli ha-habatah* attributed to Ptolemy, 14th-15th centuries).

PROJECTION OF THE HEAVENS ONTO THE EARTH

13 - Paris, Bibliothèque Nationale de France, Ms hébreu 1095 (Comtino's *Tiqqun kli ha-nehoshet*, 15th c.): Projection of the ecliptic.
14 - Berlin, Deutsche Staatsbibliothek: plate with the projections of the three heavenly circles (Capricorn, Cancer and Equator).
15 - Paris, Bibliothèque Nationale de France, Ms hébreu 1053 (Comtino's *Tiqqun kli ha-nehoshet*, 15th c.): The circles of Capricorn (outer), Cancer (inner) and the equator (middle) on any plate.

PLATES: ALMUCANTARS AND AZIMUTHAL LINES

16 - London, British Museum: azimuthal lines going through the zenith on one of the plates.
17 - London, Private Collector: plate with the projection of the circles of Capricorn (outer), Cancer (inner), and the equator (middle) under the divisions of the almucantars (circles of altitude paralells to the horizon).
18 - Moscow, Russian State Library, Ms Günzburg 274 (Abraham ibn Ezra's *Sefer kli ha-nehoshet*, 1630): Almucantars and azimuthal lines (upper half of the image) and seasonal hours (lower half) on any plate.

THE HEAVENLY PART: THE SPIDER OR RETE

19 - London, Private Collector: Rete.
20 - London, Khalili Collection: Rete.
21 - London, British Museum: Rete.

THE MATER: FRONT AND BACK

22 - Oxford, Bodleian Library, Ms. Opp. 704 (*Tziur ha-astrolab*, 1636): Front of the mater and its divisions.
23 - London, British Museum: Front.
24 - London, Private Collector: Back of the mater and alidade.
25 - Oxford, Bodleian Library, Opp. 704 (*Tziur ha-astrolab*, 1636): Shadow square on the back of the mater.

ALIDADE, PIN, AND HORSE

26 - Berlin, Deutsche Staatsbibliothek: Alidade with the pinnules or sighting vanes.
27 - Paris, Bibliothèque Nationale de France, Ms hébreu 1095 (Comtino's *Tiqqun kli ha-nehoshet*, 15th c.): Alidade and sighting vanes.